Trends, disruptors and the circular economy

Damien Giurco

Institute for Sustainable Futures
isf.uts.edu.au

EIANZ Conference
Friday 2 Nov 2018
Sydney

Institute for Sustainable Futures

ISF partners with government, industry and community to address complex sustainability challenges through transdisciplinary research.

55 Research Staff
45 PhD students
150+ projects per year

RESOURCE FUTURES
Advancing responsible and efficient production and consumption by fostering stewardship and circular resource flows

WATER FUTURES
Developing restorative, sustainable and resilient water management solutions

LANDSCAPES & ECOSYSTEMS
Enhancing ecosystem integrity and livelihoods by incorporating perceptions, values and practices into decision-making

TRANSPORT
Providing solutions for quality transport services that maximise productivity at least cost and lowest impact

ENERGY FUTURES
Accelerating the transition to more decentralised energy systems that are clean, affordable, reliable and empower communities

CLIMATE CHANGE & ADAPTATION
Helping partners adapt to the challenges of a changing climate

INTERNATIONAL DEVELOPMENT
Working in partnerships to end poverty and ensure sustainable development for all

LEARNING & CHANGE
Facilitating individual, social and organisational transformation, learning and change

CITIES & BUILDINGS
Improving the liveability of urban environments with holistic and net-positive social, infrastructure and resource solutions

FOOD SYSTEMS
Transforming food systems to ensure healthy, thriving and food secure communities and businesses

20 YEARS

Trends and disruptive influences

Climate extremes

Inequality

Water stress

Future environments and societies

Pervasive Pollution; Biodiversity loss

Declining trust

Short-term-ism

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Trends and disruptive influences

Sharing Economy

Climate extremes

Inequality

Digital disruption

Water stress

Future environments and societies

Artificial intelligence

3D Printing

Energy transition

New business models

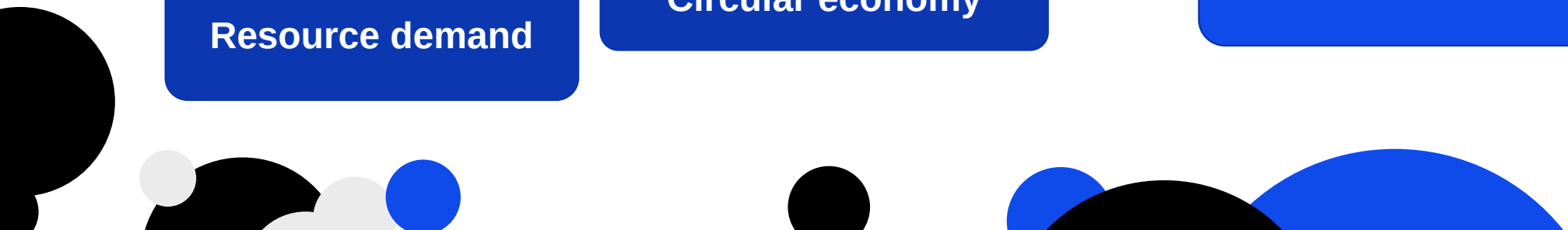
Pervasive Pollution; Biodiversity loss

Declining trust

Short-term-ism

Resource demand

Circular economy



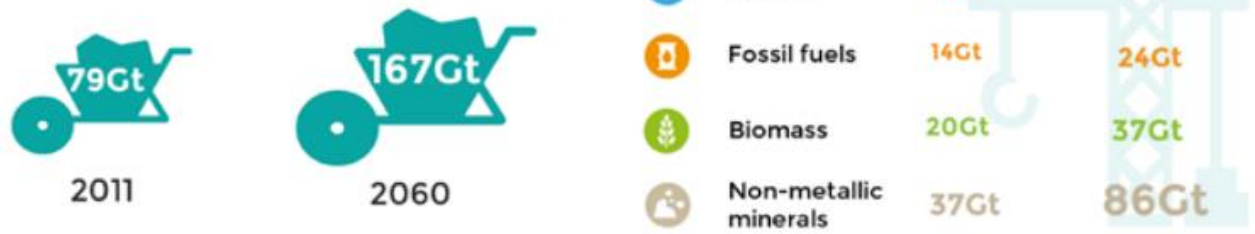
UTS Institute for Sustainable Futures

Resource demand to double by 2060

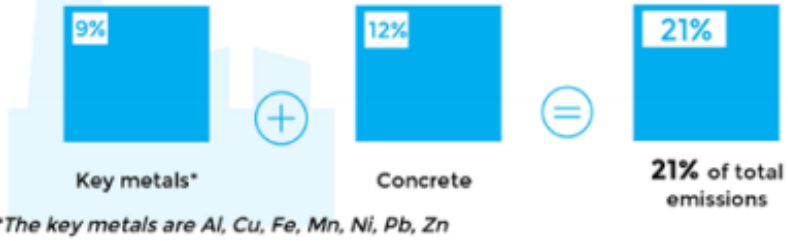
Key facts and projections from the OECD Global Material Resources Outlook to 2060

https://www.oecd.org/environment/waste/highlights-global-material-resources-outlook-to-2060.pdf

Materials use increase

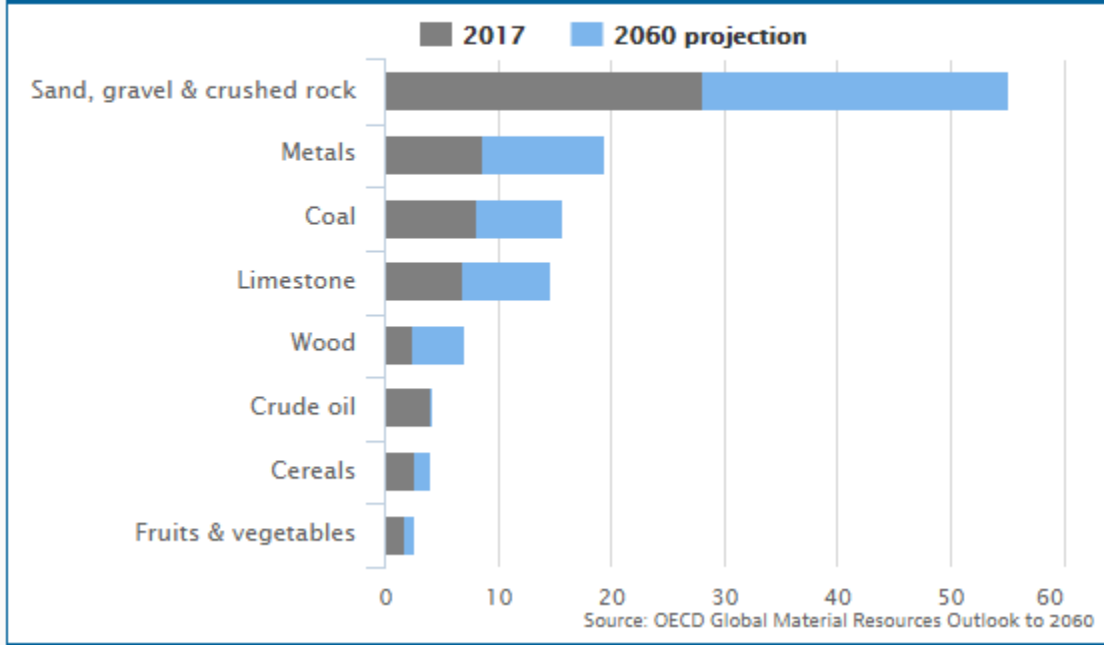


Greenhouse gas emissions in 2060 from materials extraction and processing



Construction materials dominate resource consumption

Consumption in gigatonnes

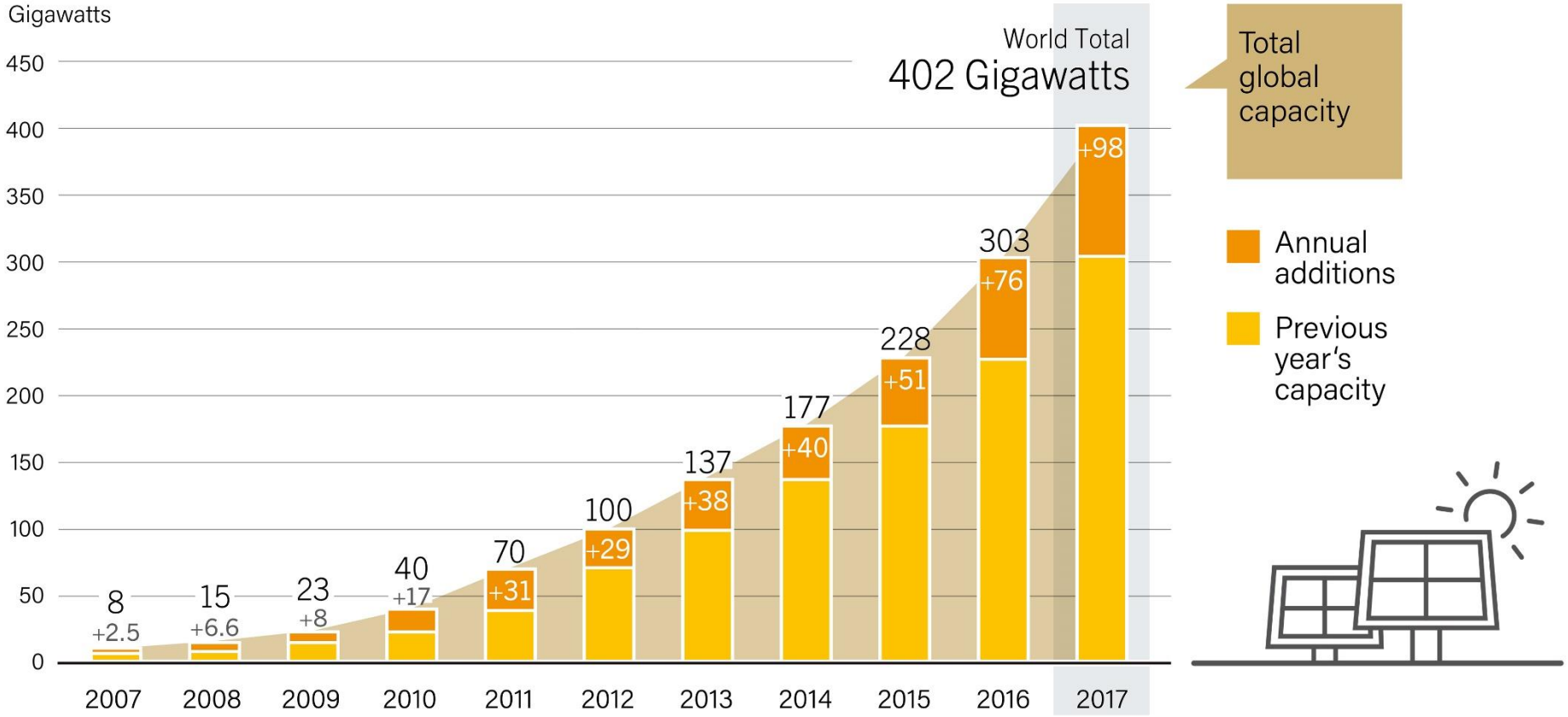


http://www.oecd.org/newsroom/raw-materials-use-to-double-by-2060-with-severe-environmental-consequences.htm

Solar PV:

98 GW installed 2017

Solar PV Global Capacity and Annual Additions, 2007-2017



Source: IEA PVPS

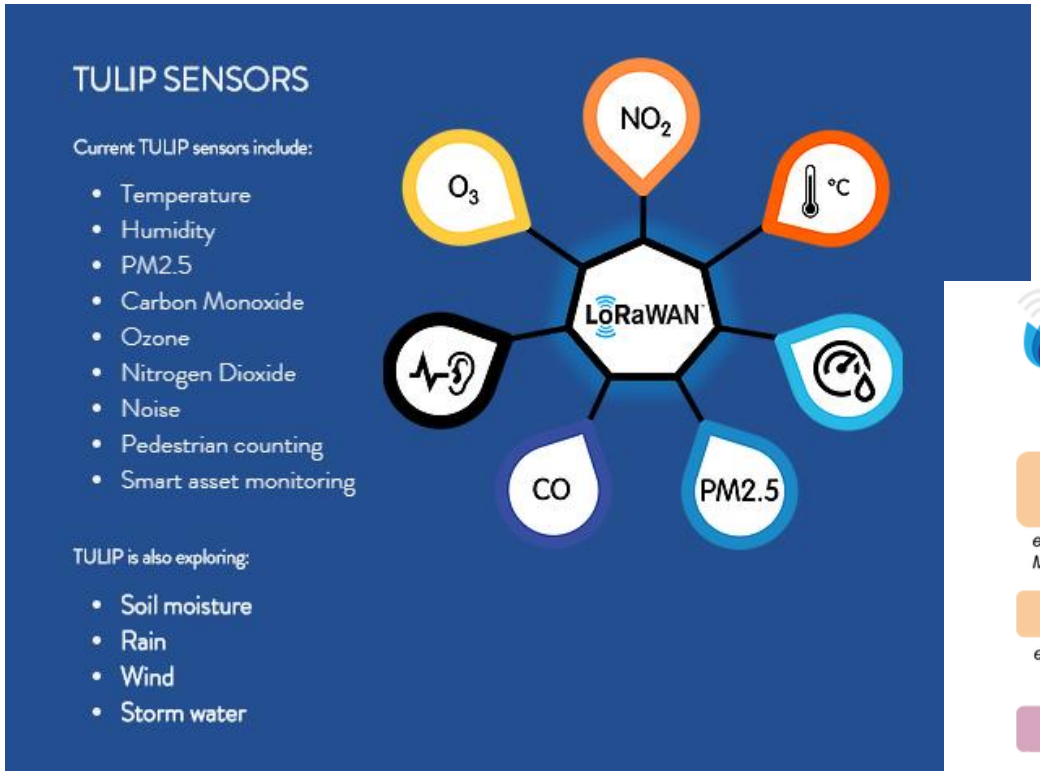
Design for renewable energy & resource cycles

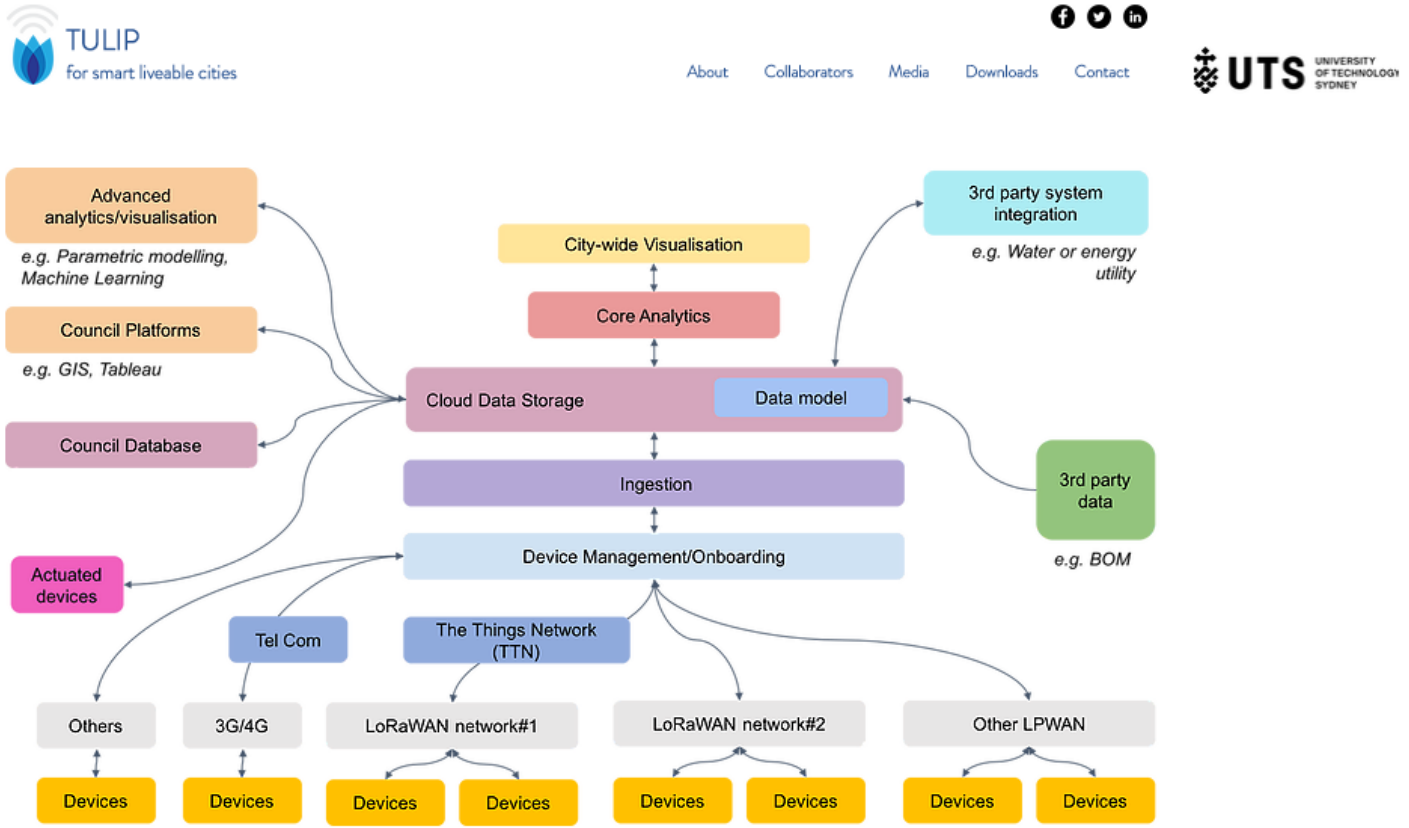
Gatton Solar Research Facility University of Queensland 2015

Business renewables

TULIP for smart liveable cities

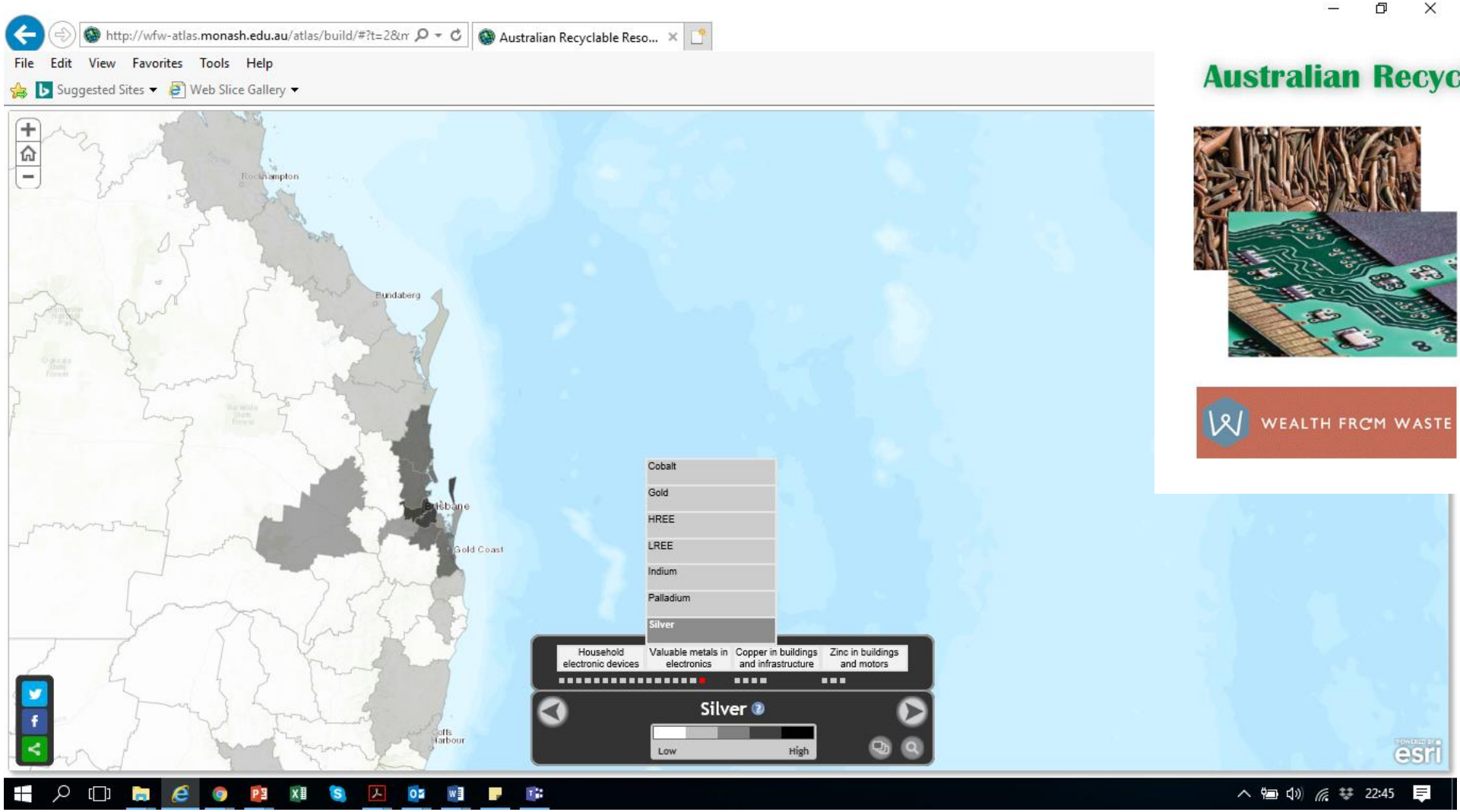
Sydney, Lake Macquarie





Andrew Tovey
https://www.tulipnetwork.org/

Mapping stocks above ground



Australian Recyclable Resources Atlas

The Australian Recyclable Resources Atlas presents the estimated, above-ground stocks of metal resources in Australia. As the population increases, more houses and transport infrastructure are to be built, and more consumer electronic products such as TV sets, mobile phones, tablets, computers and household appliances are to be used. These end-of-life products mostly contain high concentrations of metals and minerals, and recycling them is much more energy efficient than smelting the metals from virgin ores. The atlas aims to provide a comprehensive understanding of the potentials of urban mines in Australia.

WEALTH FROM WASTE

MONASH University

...informing thinking about future collection systems

http://wfw-atlas.monash.edu.au/atlas/build/

www.wealthfromwaste.net

Who is best placed to take action?

- Government
- Research
- Industry

Small-scale flexible e-waste processing

Build on *Product stewardship Act*

Support secondary markets: develop standards, procurement

Government has enabling role in innovation networks

National approach to circular economy

Recyclable resource atlas: 'Geoscience Australia' for urban mining

Changing economics, data, business models

CIRCULAR ECONOMY

opportunities for metals

Proposed “Future battery industries’

Cooperative Research Centre

FUTURE BATTERY INDUSTRIES CRC
Providing strategic leadership for Australia's Future Battery Industries

PROGRAM 1
Battery Industry Development

PROGRAM 2
Battery Resources, Processing and Recycling

PROGRAM 3
Battery Materials, Components, Manufacturing, Testing and Deployment

CRC Reliable Affordable Clean Energy

RACE FOR 2030 CRC

INFORMATION PACK

Circular Economy – more than recycling!

"a regenerative system in which resource input and waste, emission, and energy leakage are minimised by **slowing, closing, and narrowing material and energy loops**. This can be achieved through **long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling**"

Contents lists available at ScienceDirect

Journal of Cleaner Production

journal homepage: www.elsevier.com/locate/jclepro

Review

The Circular Economy – A new sustainability paradigm?

Martin Geissdoerfer [a, b, *], Paulo Savaget [a], Nancy M.P. Bocken [a, b], Erik Jan Hultink [b]

[a] Institute for Manufacturing, Department of Engineering, University of Cambridge, Cambridge, CB3 0FS, United Kingdom
[b] Industrial Design Engineering, Delft University of Technology, Landbergstraat 15, 2628, CE Delft, The Netherlands

ARTICLE INFO

ABSTRACT

World Circular Economy Forum

2050 Vision for natural resources and manufacturing

WORLD CIRCULAR ECONOMY FORUM JAPAN

If we turn to circular economy, we could be heading towards a future in which:

1. Products are designed with care, longevity and their next lifecycle in mind. Used products gain value by 3R approaches, upcycling, upgrades and repairs.
2. Industries such as manufacturing and agriculture work in closed loops and no longer produce unnecessary by-products. Global value-chains have gone through the 4th Industrial Revolution and are optimized with digital technologies and automation. Waste as we know it, is a thing of the past. It is recognized as raw material and energy.
3. We have recognized the limited amount of virgin natural resources and the economy has been adapted to ecological planetary boundaries. Investments are directed into sustainable businesses.

Table 2. Technological Developments for Industry 4.0 and the Circular Economy

Technological developments for Industry 4.0	Ten disruptive technologies for the circular economy
Information and communications technology	Mobile technology
Cyber-physical systems	Machine-to-machine communication
Network communications - internet of things (IoT)	Cloud computing
Simulation	Social media for business
Advanced data analytics	Big data analytics
Robots, augmented reality, and intelligent tools for support of human workers	Modular design technology
	Advanced recycling technology
	Life and material science technology
	Trace and return systems
	3D Printing

Industry 4.0:
Empowering ASEAN for the Circular Economy

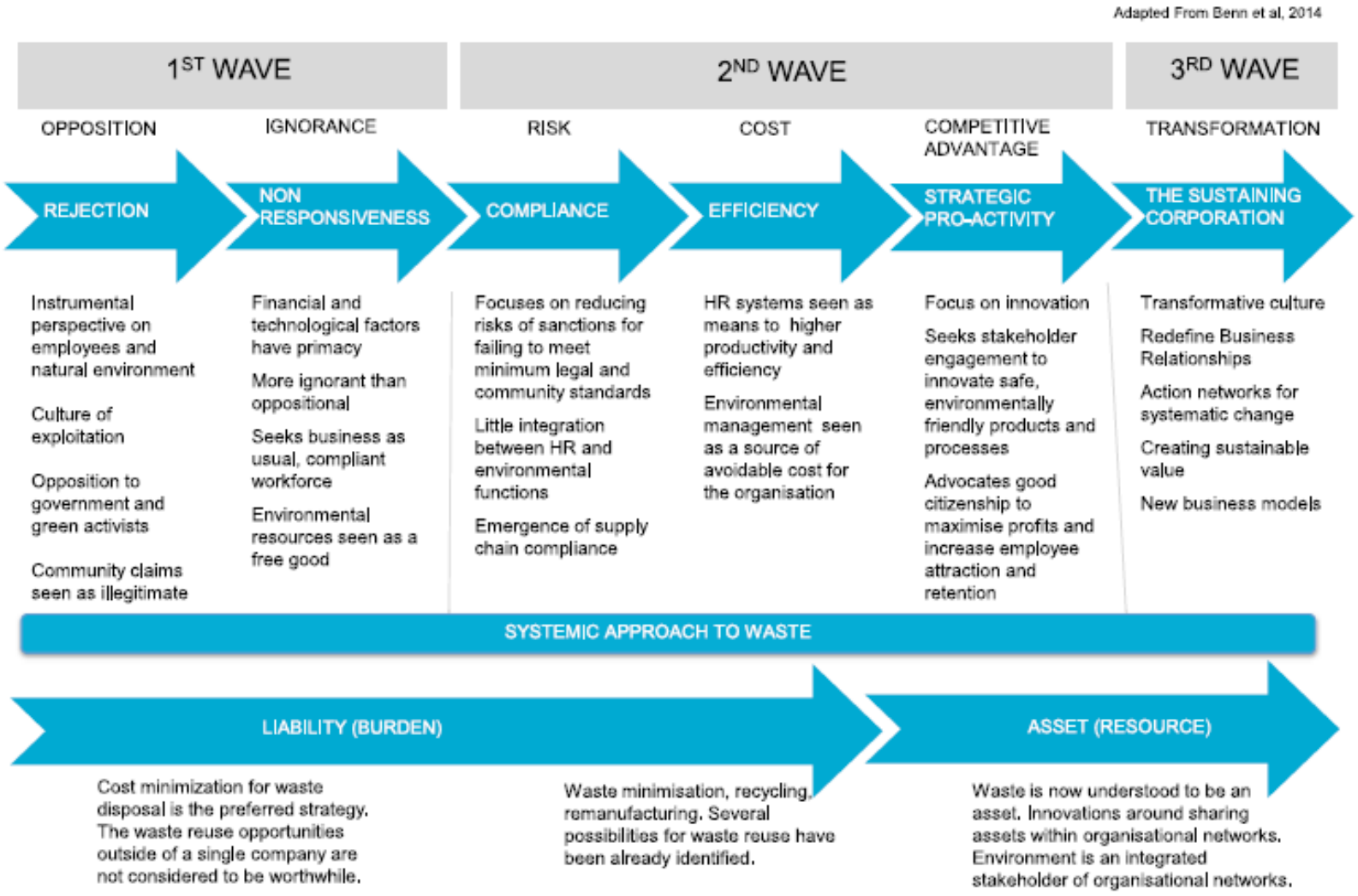
Edited by
Venkatachalam Anbumozhi and Fukunari Kimura

ERIA
Economic Research Institute for ASEAN and East Asia

Digital provenance for responsible minerals

Qld Chief Entrepreneur

Changing business value

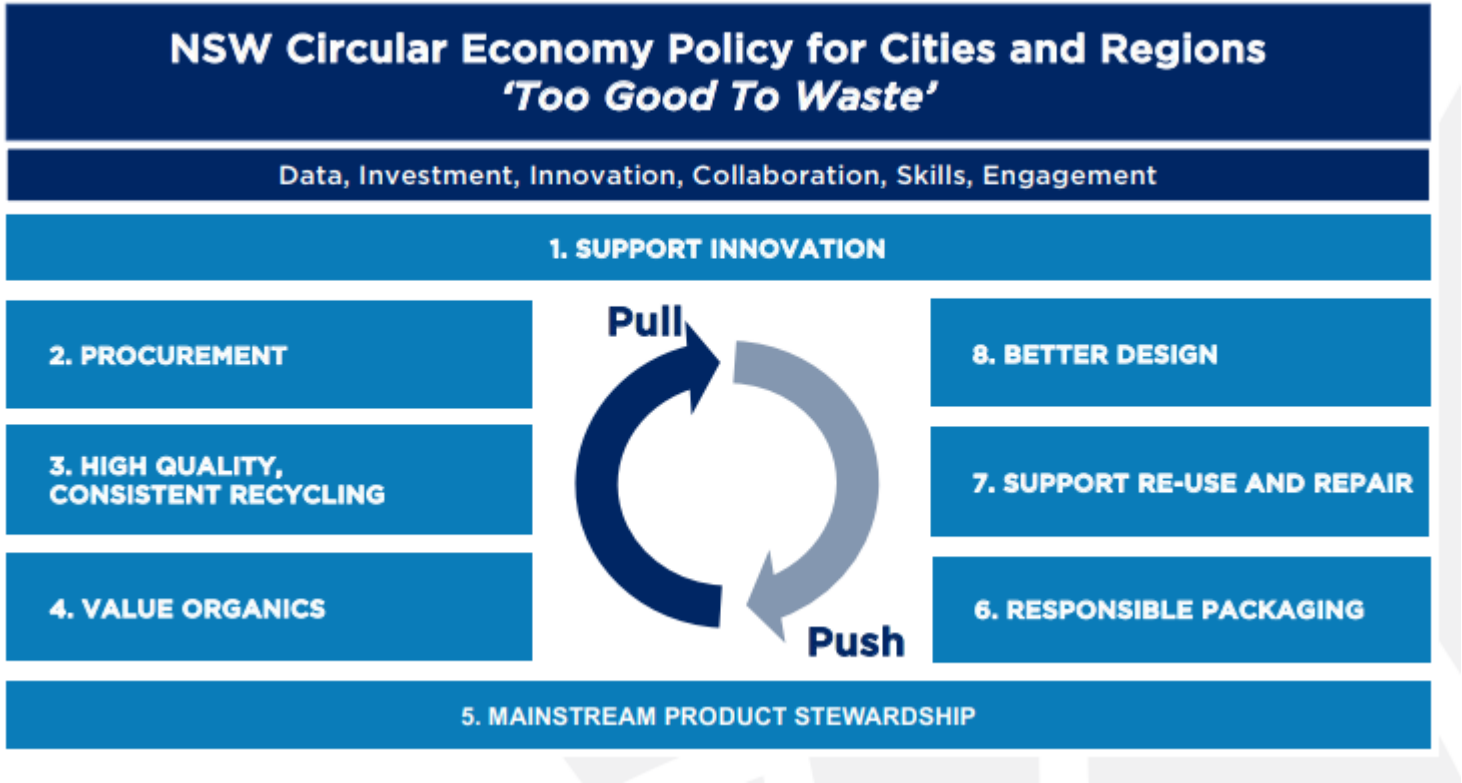


Received: 9 February 2016 | Revised: 18 February 2017 | Accepted: 18 February 2018
DOI: 10.1002/bse.2068
SPECIAL ISSUE ARTICLE
WILEY

The place of waste: Changing business value for the circular economy

Robert Perey | Suzanne Benn | Renu Agarwal | Melissa Edwards

Circular Economy Policy NSW
(Draft for consultation)



Questions for the circular economy in a digital age

Climate extremes

Inequality

Water stress

How will we support responsible prosperity for future societies?

Energy transition

New business models

Resource security

Circular economy

Which SDGs will the digital age most inclusively enable?

What digital disruption will society embrace and decline?

How will we balance efficiency vs. privacy?

Pervasive Pollution; Biodiversity loss

Declining trust

Short-term-ism

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Which SDGs will the digital age most inclusively enable?

What digital disruption will society embrace and decline?

How will we balance efficiency vs. privacy?

Who holds power in a circular economy?

When will the clean energy, digital and circular resource transitions align?

How is value/risk shared?

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Thank you

Damien Giurco
Damien.Giurco@uts.edu.au
Tel: +61 2 9514 4978

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isf.uts.edu.au